

Georgia State Board of Examiners for Certification of Water and Wastewater Treatment Plant
Operators and Laboratory Analysts

Wastewater Laboratory Analyst Need to Know

Laboratory Tests

Wastewater laboratory analysts need to be familiar with the following laboratory tests:

Group 1 Tests

- Alkalinity
- Ammonia
- Biochemical Oxygen Demand
- Chemical Oxygen Demand
- Chlorine
- Coliform
- Conductivity
- Dissolved Oxygen
- Fecal Coliform Bacteria
- Nitrate/Nitrite
- Oxidation Reduction Potential
- pH
- Phosphorus
- Temperature
- Total Dissolved Solids
- Total Kjeldahl Nitrogen
- Total Suspended Solids
- Turbidity
- Volatile Acid/Alkalinity

Group 2 Tests

- Bioassay
- Metals (including dissolved metals)
- Oil & Grease
- Organics

For Group 1 Tests and Group 2 Tests, the analysts need to know:

- Basic definition of the test
- How to properly collect the sample
 - What type of sample to collect (grab or composite)
 - What type of container to use for collecting the sample
 - Where to collect the sample
- The regulatory-approved preservation technique for the sample
- The regulatory-approved holding time for the sample
- How the results of the test should be expressed
- How the results should be reported to the State

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For Group 1 Tests, analysts also need to know:

- How to properly analyze the sample
 - Where to find the regulatory-approved method for analysis
 - Regulatory-approved method for analysis
 - Step-by-step procedure for analyzing the sample
 - Name and purpose of reagents and materials used in the analysis
 - What apparatus and equipment is used in the analysis
 - Potential interferences
 - What can be done to prevent interferences
- How to perform any calculations associated with the analysis
- What Quality Assurance/Quality Control measures should be taken

Laboratory Apparatus and Equipment

Wastewater laboratory analysts need to be familiar with the following laboratory apparatus and Equipment:

- Autoclaves
- Balances
- Buret
- Computers
- Conductivity Meters
- Desiccators
- Digestion Apparatus
- Distillation Apparatus
- Dissolved Oxygen Meters
- Drying Ovens
- Incubators
- Ion Selective Electrodes
- Fume Hoods
- Laboratory Glassware
- Microscope
- Muffle Furnaces
- pH Meters
- pH Probes
- Spectrophotometer
- Thermometer
- Turbidimeter
- Volumetric Glassware
- Waterbath
- Water Purification Equipment

Wastewater Laboratory Analyst Need to Know

For the preceding laboratory apparatus and equipment, analysts need to know:

- Which laboratory tests use the apparatus or equipment
- How to operate the apparatus or equipment
- Frequency and procedure for calibrating the apparatus or equipment
- How to maintain the apparatus or equipment
- Frequency and procedure for cleaning the apparatus or equipment
- How to properly store the apparatus or equipment
- Basic theory behind how the equipment operates
- How to troubleshoot the equipment

Basic Laboratory Procedures

Wastewater laboratory analysts need to be familiar with the following basic laboratory procedures:

- Digestion
- Dilution
- Distillation
- Filtration
- Mixing
- pH Adjustment
- Preparing laboratory pure water
- Reagent addition and preparation
- Sample concentration
- Sterilization
- Temperature adjustment

For the preceding basic laboratory procedures, analysts need to know:

- A definition of the term(s)
- How to perform the procedure
- Name and purpose of materials and reagents used in the procedure
- What apparatus and instruments are used to perform the procedure
- How to perform calculations associated with the procedure

Quality Assurance and Quality Control

Wastewater laboratory analysts need know how to perform the following Quality Assurance and Quality Control procedures:

- Develop, maintain, and interpret control charts
- Establish method detection limits and reporting limits
- Prepare calibration curves

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- Establish quality assurance plans
- Maintain training records
- Perform corrective actions
- Conduct proficiency tests
- Validate data
- Record data
- Determine significant figures

Chemicals and Wastes

Wastewater laboratory analysts need to know the following about chemicals and wastes:

- What types of chemicals are used in each analysis
- How to prepare chemical reagents
- How to store chemicals
- How to determine quantity to purchase
- What personal protective equipment to use when handling a specific chemical
- How to properly dispose of chemicals
- How to dispose of biohazardous waste
- How to properly label chemicals

Laboratory Safety

Wastewater laboratory analysts need to be familiar with safety aspects involving the following:

- Chemical storage
- Fire extinguishers
- Fume hoods
- Acids
- Bases
- Oxidizers
- Personal protective equipment
- Eyewashes
- Safety showers
- Burns
- Confined spaces
- Infectious material
- Chemical spills
- Material Safety Data Sheets (MSDS)
- OSHA regulations

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Definitions

Wastewater laboratory analysts need to know the definitions of the following terms:

- 95% confidence level (a statistical term)
- Acid
- Accuracy
- Adsorption
- Anhydrous
- Atomic weight
- Base
- Buffer
- Catalyst
- Chain-of-Custody
- Composite sample
- Denitrification
- Digestion
- Disinfection
- Distillation
- Duplicate, or Replicate sample
- Fecal coliform bacteria
- Grab sample
- Inorganic
- Laboratory pure water
- Method Detection Limit (MDL)
- Molarity
- Molecular weight
- Nitrification
- Normality
- Organic
- Precision
- Standard Operating Procedures
- Solute
- Specific gravity
- Sterilization
- Surrogate standard
- Titrant
- Titration
- Waste minimization

Math

- Temperature conversions ($^{\circ}\text{C}$ to $^{\circ}\text{F}$ and $^{\circ}\text{F}$ to $^{\circ}\text{C}$)
- Volume calculations
- Dosage (in pounds) calculations
- Normality calculations
- Percent calculations